THE AMERICAN

JOURNAL OF PHARMACY.

SEPTEMBER, 1891.

DIALYSIS BY MEANS OF SULPHATE OF CALCIUM.

By Guadalupe Morales, Ph.G., of Nicaragua, C.A.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 94.

In a monograph (See *Am. Jour. Pharmacy*, 1889, p. 159) published by Mr. A. L. Herrera, from Mexico, wherein he treats of Chemical Dialysis, a new process he has invented, caused me to try his experiments, following his instructions, to determine if that process could have any practical application for the extraction of alkaloids.

He says that it has not been studied with elaborate care; what he has done has been to establish the general principles, corroborating them with a certain number of experiments, done with several substances under different conditions, and to point out the application they may have, leaving to the study of others, who may want to try them, to determine if the applications which he indicates can have any practical value; he declares that he does not know many of the imperfections and objections attached to his process.

In order to understand better the process of Mr. Herrera, I will extract and condense from his paper the more important points.

"When water or an aqueous solution is separated from calcined sulphate of calcium by a membrane of parchment paper, the water passes through the membrane and is employed in the hydration of the sulphates; besides, if the substances in solution are crystalloid, they totally pass from the interior to the exterior of the dialyzator; it does not happen thus if they are colloid.

"For example: if a parchment paper filter be filled with water containing albumen and sodium chloride, and its external surface is put in contact with calcined sulphate of calcium in powder, the water and the salt pass to the absorbent, and the albumen remains in the dialyzator.

"If the sulphate be substituted by fused chloride of calcium, by quick-lime and in general by any hygroscopic substance, the same result is obtained as with the first of these absorbents.

"Taking as a foundation the results gotten above, it can be said that the chemical affinity of the absorbent for the liquid is the determinate cause of the phenomenon."

Practice of the Chemical Dialysis.—Mr. Herrera indicates first the different kinds of septum that can be used, viz: parchment paper, animal septum, the epidermis of American Agave, clay vessels, slate, etc., and he presents the advantages and disadvantages of each one, but at last recommends parchment paper as more convenient and general in its application. The calcium sulphate should be freshly calcined, should absorb at least two parts by weight of water and should produce heat in the act of being hydrated. The empty dialyzator, folded like a filter and attached to a rectangular wooden frame, is introduced into a vessel containing the calcined sulphate of calcium in powder, taking care that the contact with the outer surface of the membrane may be as complete as possible, the liquid is poured in and the whole set aside for some time. In order to increase the rapidity of the operation the solid crust of hydrated sulphate of calcium formed around the filter is removed, powdered and put again in the vessel. If organic matter in a state of decomposition be dialyzed the membrane must be changed frequently. In order to recover the crystalloid substance, the calcium sulphate is powdered, packed in a percolator and extracted with alcohol.

Applications.—The process may be applied to the separation of organic acids from solution, or to the extraction of alkaloids. The latter is founded on the general facts: 1st, that the salts of organic bases belong to the class of crystalloid substances; 2d, they are soluble in acidulated water, and 3d the same salts are soluble in alcohol. He gives the following method that may be adopted. After macerating the powdered drug for 24 hours in water slightly acidulated with tartaric acid the mixture is filtered, and the filtrate subjected to dialysis with the precautions given above. When the

liquid contained in the dialyzator is not precipitated by the general reagents for alkaloids, the process is discontinued.

" The hydrated absorbent is powdered and by means of lixiviation or maceration with concentrated alcohol the organic salts are separated.

" Proceeding in this way an almost pure alcoholic solution of the alkaloidal salt is obtained, not containing extractive, coloring or resinous matter. For extracting the organic base it is sufficient to separate the alcohol by distillation or evaporation, to dissolve the residue in water and precipitate by means of an alkali or alkaline carbonate."

He considers the process may be applicable to the separation of glucosides, to the concentration of extractive liquids, to the concentration of extracts which owe their activity to colloid substances and to toxicological investigations.

My own experiments on the above methods.—The following are some of the results of my own experiments which I made three times.

Ten grams of powdered opium were macerated for 24 hours in water acidulated with ·5 per cent. of tartaric acid, after this time the liquid was filtered and the residue washed with water until 200 cc. of the liquid were obtained. I started the dialyzation, using two dialyzators made of parchment paper, folded like filters and fastened to wooden frames. I divided the liquid between the two and surrounded them with recently calcined sulphate of calcium. After 24 hours the level of the liquid in the dialyzators had lowered, and with the object of putting the septum in contact with a fresh portion of the absorbent, I removed, carefully, the filter and scraped the hydrated part off and removed it as completely as possible from the non-hydrated portion, using the latter as an absorbent for a continuation of the process. The operation was then continued for four days, at the end of which time one of the parchments commenced to decompose and the liquid was transferred to the other, at the end of two more days the 2d parchment commenced to decompose and the operation was stopped.

After powdering the hydrated sulphate it was packed in a percolator and treated with 1,200 cc. of 95 per cent. alcohol, employing about 5 days in the percolation, which was stopped when the percolate ceased to give any reaction for alkaloids.

The alcohol was recovered from the percolate by distillation, and the residue treated according to Dr. Squibb's method for the estimation of morphine. Narcotine was found in the ethereal washings, and the amount of morphine found was 7·77 per cent. The non-dialyzed liquid showed a considerable quantity of morphine and narcotine by qualitative tests.

It can be seen from the above experiments that the results were not very satisfactory for Mr. Herrera's process, at least for assaying purposes, when it is taken into account that I found in the same opium 14·41 per cent. of morphine, following Dr. Squibb's method for determination of the alkaloid.

Since it is a new process, and consequently subject to improvements by a thorough and conscientious study, I do not want to condemn it. It has, no doubt, some value for separating alkaloids *qualitatively*, for example in toxicological investigations, since it transfers them without exposure to heat, to an absorbent, sulphate of calcium, from which they may be readily removed without fear of decomposition.

My experiments show that *quantitatively* the method is without value, as there are other processes more accurate, less expensive and more rapidly executed.

THE LEAVES OF CEANOTHUS AMERICANUS.

By John A. Buckner, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 93.

The plant from which the leaves were obtained was fully described by F. C. Gerlach, Am. Jour. Pharmacy, 1891, p. 332, in his paper on the analysis of the root. As stated there, the leaves have been used as a substitute for tea, and the following analysis was undertaken with a view of seeing how nearly they resembled the tea leaves in chemical composition.

Five grams heated in an air-bath at 100° to 110° lost ·305 grams = 6·10 per cent. of moisture. Five grams after ignition weighed ·265 grams = 5·30 per cent. of ash. Fifty grams in fine powder were exhausted by petroleum ether, and the extract, after recovering the solvent by distillation, weighed ·889 grams = 1·77 per cent. This consisted of ·038 per cent. of volatile oil, ·022 per cent. fat, ·51 per cent. wax, and 1·20 per cent. caoutchouc. Stronger ether then

extracted from the drug 2·19 per cent., which was found to consist of gallic acid and resin. This extract gave negative tests for alkaloids. Absolute alcohol next extracted 5·99 grams = 11·98 per cent. This extract was first treated with distilled water and the aqueous solution tested for alkaloids with negative results, and the water yielded nothing when agitated with such solvents as petroleum ether, ether and chloroform, except that the stronger ether removed some gallic acid. Further agitation removed a yellowish-red crystalline substance, which gave tests with ferric chloride and lead acetate corresponding to quercitrin.

Distilled water extracted from the remaining drug 3·71 per cent. of organic matter, consisting of mucilage 3·04 per cent., and sugar ·67 per cent.

Dilute alkali solution extracted 1·76 per cent. of albuminoids, and dilute acid extracted 1·76 per cent., consisting almost entirely of calcium oxalate.

Lignin extracted by chlorine water = 7·37 per cent., and the remainder 58·37 per cent. = incrusting matter and cellulose.

The tannin was estimated as follows: Ten grams of the drug were treated with distilled water in separate portions for two hours. The filtered liquids were mixed and made up to 500 cc. 25 cc. of this were diluted with two volumes of water, and this, while warm, was completely precipitated with a solution of gelatin and alum (·5 gram gelatin, 2·5 grams alum and 250 cc. water) added carefully, with constant stirring. The precipitate was collected, well washed, dried at 110° and weighed. An average of two determinations gave 9·45 per cent. of tannin.

As these leaves have been used as a beverage to replace coffee and tea, I thought other than the astringent principle might be present, and tried the following assay process for theine. Five grams of the drug were treated with boiling distilled water. The filtered liquid was evaporated, with the addition of two grams of calcined magnesia and five grams of fine sand, to complete dryness. The residue was placed in a flask with 60 cc. of ether and 10 cc. of chloroform and allowed to stand 24 hours. This was repeated twice and the solvents, after separation, were mixed and recovered by distillation. The residue, dissolved in acidulated water, gave negative reactions for alkaloids.

I then tried the following method with similar negative results:

Fifty grams of the drug were macerated for two days in water containing one per cent. of sulphuric acid. The liquid filtered off, evaporated somewhat, and agitated with ether. The ethereal solution was allowed to evaporate spontaneously, and yielded a mass of needle-shaped crystals, which proved to be gallic acid. The liquid was then rendered alkaline with sodium hydrate and again agitated with ether, which was allowed to evaporate spontaneously, and the residue tested for alkaloids, with negative results. The formation of the gallic acid indicates that the tannin of ceanothus leaves readily yields gallic acid.

PROXIMATE ANALYSIS OF THE ROOT OF CEANOTHUS AMERICANUS.

By John E. Hitchcock, Ph.C.

The root is astringent and imparts a red color to water and to alcohol.

The scheme followed is Dragendorff's as outlined in "Prescott's Organic Analysis," 1889, p. 423. The root to be examined was reduced to a No. 60 powder and all particles of iron removed with a magnet.

I. Two grams were dried rapidly until they ceased to lose weight, at 110° C.—the difference in weight indicating a loss by moisture of 8·285 per cent.

II. Two grams were now taken and ignited in a platinum crucible; the weight of the residue indicated 2·76 per cent. as total ash.

In the water solution of this ash was found potassium sulphate, potassium chloride, and traces of sodium and magnesium; the dilute hydrochloric acid solution showed calcium and magnesium phosphates and carbonates, the residue, insoluble in water and acid being silica.

III. Ten grams of the powder were placed in a flask, macerated with 100 cc. of petroleum benzin for eight days, and the solution rapidly evaporated in a dry current of air, the residue making a total benzin extract of ·92 per cent. Water was now added to the dry extract, and this again dried in an air bath at 110° C. in order to drive off all traces of volatile oil or other vaporizable matter, the difference in weight indicating ·14 per cent. as volatile oil in the benzin extract. This oil has a strong peculiar aromatic odor, a

greenish color and a slightly bitter taste. The remainder of the benzin extract consists of a hard resin and chlorophyll.

IV. After having thoroughly washed with petroleum benzin, and dried at 110° C., the drug was macerated with 100 cc. of dry ether for eight days in a cool, dark place, and the liquid evaporated as before; the weight of the residue indicated a total ether extract of 1·91 per cent. This extract was insoluble in water, but readily soluble in 98 per cent. alcohol, from which solution a grayish-white hard resin was separated on pouring it into cold acidulated water. This resin is turned yellowish-brown by cold concentrated sulphuric acid, and on heating a faint purple is produced. Froehde's reagent in the cold gives a brown reaction, and in the hot solution an apple-green.

V. The powder was now well washed with ether, dried, then macerated with 100 cc. of 98 per cent. alcohol for eight days, and the liquid evaporated, leaving 3·205 per cent. alcoholic extract. 36·7 per cent. of this extract was soluble in cold water. This portion gave reactions for tannic acid, with the following reagents:—a greenish-black with a ferrous and ferric solution, precipitates with tartar emetic, copper acetate and gelatin. The amount of tannin present in this solution, as estimated with lead acetate, is ·218 per cent.

The remainder of the alcoholic extract was dissolved with very dilute ammonia water, and from this solution there was precipitated by acetic acid 1·21 per cent. of phlobaphene. The extract also contained a red coloring matter and a resin.

VI. The drug was again washed, dried and then macerated for 48 hours with 100 cc. of water, total water extract being 5·88 per cent. Ten cc., treated with 98 per cent. alcohol, gave 0 22 gm. as the weight of water extract insoluble in diluted alcohol. A filtrate from this precipitate was concentrated and again treated with three times its volume of 98 per cent. alcohol, giving 0·055 gm. as the weight of water extract insoluble in stronger alcohol. The portion insoluble in dilute alcohol was principally gummy matter. That insoluble in the stronger alcohol was albumen and mucilage. Traces of sugar were also found in the water solution.

VII. The powder was next macerated with a ·2 per cent. solution of sodium hydrate for 24 hours; the liquid acidulated with acetic acid and treated with 90 per cent. alcohol, which precipitated 4·74 per cent. of albuminous and pectous substances. The remainder of

the alkali extract was undetermined, and represented 14·03 per cent.

VIII. After washing free from the alkali, the residue was treated with acidulated water for 24 hours; 12·8 per cent. were extracted from this solution, which consisted of inorganic salts and starch.

IX. The remainder of the drug, after thoroughly washing and drying, was weighed and estimated as cellulose and lignin, equalling 43·2 per cent.

An aqueous infusion was made with one gram of the powder, and tannin estimated with copper acetate, which gave 6·81 per cent. the total amount of tannin in the root. The total albumen as estimated by Kjeldahl's method was 2·375 per cent.

SUMMARY.

Moisture,		8·285
Ash,		2·61
Petroleum benzin Extract,		·926
Ether	"	1·91
Alcohol	"	3·25
Aqueous	"	5·88
Alkali	"	4·74 14·03
Acid	"	12·80
Cellulose and Lignin,		43·20
Loss,		2·37
		100·00

See also analysis of the root bark of ceanothus, Am. Jour. Phar., 1891, July, p. 332, and of the leaves, ibid., Septbr., p. 428.

FABIANA IMBRICATA.

A Plant Analysis.

By Harry C. Loudenbeck, Ph.C.

Under the name of "Pichi," *Fabiana imbricata* is known in Chili and Argentine Republic for its prompt action in diseases of the kidney and liver.

This shrub which might be taken for a conifer, belongs to the natural order Solanaceæ, sub-order Curvembryeæ and tribe Nicotianeæ. It grows on high and dry hill tops, and is remarkable for its light bluish-green branches, which are covered with a resinous matter, that hardens, forming a gray powder. In trade Pichi consists of the stems and leafy branches which are covered with a thin gray bark to which a considerable resinous matter adheres.

It was first brought to notice by Dr. Henry H. Rusby,[1] who wrote a botanical description and made a crude, but, under the circumstances, a good chemical analysis of the drug. He observed that by extracting with ether, alcohol, or water, the extractive produced with ammonia a deep blue fluorescence, which he supposed to be due to a resin. He also obtained with the same fluids a heavy brown precipitate upon adding a solution of iodine in potassium iodide.

Dr. A. B. Lyons[1] found: A minute quantity of some alkaloid that formed crystallizable salts, a neutral crystalline principle, a fluorescent body much like æsculin which he did not succeed in crystallizing, a volatile oil, and a resin.

George A. Deitz[1] took up the work and made quite a full plant analysis of the drug, and succeeded in crystallizing the fluorescent principle, but could not find an alkaloid as reported by Dr. Lyons. He also reported "no tannin," and Prof. Henry Trimble[1] and J. M. Schroeter made a further investigation of the neutral principle, making combustions of the same and calculating therefrom the formula $(C_{18}H_{31}O_2)_x$.

I have given a summary of the work that has been done, so that a better understanding may be had of my work and the questions involved.

THE ANALYSIS.—The leaves and branches were ground together and passed through a number 60 sieve.

I. *Treatment with petroleum ether.*—Ten grams of the powder was taken and macerated with 100 cc. of petroleum ether for 10 days. This solvent extracted 5·64 per cent., fat and wax 3·24 per cent., volatile oil 2·22 per cent., and a small amount of fluorescent principle and a caoutchouc-like body, that burns with a crackling sound and a bright flame and is soluble in chloroform but insoluble in alcohol, and distils with white fumes of a suffocating odor.

II. *Treatment with stronger ether.*—The drug freed from the previous solvent was treated with 100 cc. of stronger ether that was entirely free from water, and macerated for 10 days. Total amount dissolved 3·94 per cent. The ethereal extract was evaporated and this residue treated by means of a Gooch crucible with hot water. The residue after washing thoroughly seemed to be full of minute

[1] See references at the close.

crystals, which I concluded was the neutral principle. The mass was entirely soluble in absolute alcohol, from which the neutral principle crystallized out in small shining crystals of a pure white color. They dissolved readily in absolute alcohol, ether and chloroform, but were insoluble in water. Besides this principle, the residue consisted of a light colored resin soluble in alkalies, producing an intense yellow solution, and a minute quantity of chlorophyll. The hot water extracted 1·09 per cent. The aqueous solution was agitated with chloroform and setting aside it deposited upon evaporation a considerable quantity of the fluorescent principle in the form of minute needles, which I purified by dissolving in water and recrystallizing and finally obtained them quite pure and of a light nearly white color. They have a bitter taste and give an intense blue fluorescence with ammonia, which is changed by acids to a much paler but distinct rose fluorescence.

With iodine in a potassium iodide solution it gives a reddish brown precipitate; with bromine water it gives a blue precipitate which is soluble in chloroform, forming a pink solution. The bromine water must be added in a minute quantity so as not to be in excess, otherwise it would destroy the peculiar color of the chloroform layer and change the blue precipitate to a dirty brown. Strong hydrochloric acid, added to the crystals and a minute portion of potassium chlorate added, gives a bright red color, which when heated on a water-bath gives a reddish violet. It gives no precipitate with ordinary alkaloidal reagents, such as Mayer's reagent, picric acid, ammonium molybdate, etc. It gives no precipitate with the salts of the heavy metals, such as copper sulphate, silver nitrate, mercuric chloride, lead acetate, ferric chloride and gold chloride. It melts at 190° C., forming a dark yellow liquid, and at a few degrees higher it decomposes, forming very irritating fumes. That it is a glucoside is proved by its readily reducing alkaline solution of copper. The impure aqueous solution of the ether residue gives precipitates with alkaloidal reagents, and thinking that perhaps there was an alkaloid mixed with the fluorescent principle, I made the solution acid and shook out with chloroform until the fluorescent principle was entirely extracted, then the solution was made alkaline and treated again with chloroform, which was siphoned off and allowed to evaporate; a soft neutral resin was left, of an intense bitter and tingling taste; it is insoluble in water, not easily soluble in alkalies, but was soluble

in 80 per cent. alcohol. It may be a decomposition product formed by the action of the acid upon the glucoside. It will be seen that no alkaloid was found, and it is probable that the glucoside mixed with impurities has been mistaken for an alkaloid.

III. *Treatment with 95 per cent. alcohol.*—Total amount dissolved 11·12 per cent., nearly all of which was soluble in water. The water solution was treated with chloroform; upon separating the chloroform layer and allowing it to evaporate spontaneously, an additional quantity of the fluorescent principle was obtained, but no results by treating the acid and alkaline solutions in like manner.

The water solution gave the following reactions:

Solution of ferric chloride, inky green precipitate.

Solution of lead acetate, golden yellow precipitate.

Solution of copper acetate, dirty yellow precipitate.

Solution of gelatin, white precipitate (slight).

Solution of molybdate of ammonium, a red color.

Solution of ferrocyanide of potassium, with ammonium hydrate, a deep red color.

Solution of cinchonine sulphate, a white precipitate.

The water solution was precipitated with lead acetate and the amount of the peculiar tannin found to be ·78 per cent. The amount of the alcoholic residue not soluble in water was soluble in dilute ammonia, and consisted of phlobaphene.

IV. *Treatment with water.*—Total amount dissolved, 8·8 per cent. A small amount of mucilage was found and 1 8 per cent. of dextrin, organic acids and allied substances 7 per cent.; probably a large amount of this is tannin and gallic acid.

V. *Treatment with ·2 per cent. solution of potassium hydrate.*—Total amount dissolved, 10·5 per cent., mucilage 1·55 per cent., albumen 3·88 per cent., undetermined substances 5·07 per cent.

VI. *Dilute acid* dissolves a very small amount. Cellulose and lignin 45·4 per cent., ash 4 per cent., moisture 8 per cent.

SUMMARY.

	Per Cent.	Per Cent.
Ash,		4·00
Moisture,		8·00
Petroleum ether Extract,		
(*a*) Volatile Oil,	2·22	
(*b*) Wax and Fat,	3·24	
(*c*) Fluorescent Principle and caoutchouc-like body, small amount,		5·65

	Per Cent.	Per Cent.
Ethereal Solution,		
(*a*) Fluorescent Principle (impure),	·6	
(*b*) Light Colored Resin,	2·5	
(*c*) Neutral Principle and Chlorophyll,	·14	
(*d*) Undetermined Substances,	·7	3·94
Alcoholic Solution,		
(*a*) Organic Acids (tannin),	·78	
(*b*) Phlobaphene,	3·12	
(*c*) Undetermined Substances (resin, fluorescent principle),	7·22	11·12
Aqueous Solution,		
(*a*) Dextrin,	1·8	
(*b*) Organic Acids and Allied Substances,	7	8·8
Dilute Potash Solution,		
(*a*) Mucilage,	1·55	
(*b*) Albumen,	3·88	
(*c*) Undetermined Substances,	5·07	10·50
Intercellular Tissue, as Cellulose and Lignin,		45·04
Loss,		3·96
Total,		100·00

Methods for extracting fluorescent principle.—Several methods were used for extracting the glucoside from the plant. A strong decoction was made, and to the wine colored liquid was added acetate of lead; this threw down a heavy precipitate of coloring matter and organic acids, which was filtered off and the clear filtrate treated with hydrogen sulphide which precipitated the excess of lead. The precipitate was filtered off and the filtrate concentrated, which caused the fluorescent principle to crystallize out; it was purified by dissolving in hot water and re-crystallizing. If charcoal is used in purifying, it seems to absorb the glucoside and prevent it from crystallizing.

Another method was to extract the drug with dilute alcohol, recovering the alcohol by distillation, drying the residue and powdering with sand; treat this with successive portions of hot water and filter, shake the filtrate with chloroform which dissolves the glucoside, remove the chloroform layer, evaporate off the chloroform, which may be recovered by distillation, and a white mass is left, consisting chiefly of the fluorescent principle which may be purified by dissolving in hot water and crystallizing. The fluorescent glucoside seems to be the bitter principle of the drug and deserves further study.

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My thanks are due to Messrs. Parke, Davis & Co., of Detroit, who sent me a liberal supply of material.

SCHOOL OF PHARMACY OF THE UNIVERSITY OF MICHIGAN, June, 1891.

CARPAINE IN NORTH AMERICAN PAPAYA LEAVES.

BY J. B. NAGELVOORT.

It is well known that plants grown under different conditions may differ very essentially in some of their constituents; thus Cinchona Calisaya grown in hothouses is said not to produce alkaloids, and I think it was Leunis who made the statement that Conium maculatum, grown in Scotland, is free from coniïne. It seemed to me worthy of a trial to submit Carica Papaya, grown in Detroit, United States, to an analysis, since Dr. Greshoff discovered that the young leaves grown in Java, contained an alkaloid, which he called carpaïne. I refer to the original contributions from the chemical laboratory of the Botanical Garden at Java.[1] Mr. Geo. S. Davis, very liberally allowed me to cut down, for this purpose, the young leaves of ten nice healthy papaya trees, raised in his greenhouse, but at the time of this investigation, transplanted out-doors; these leaves were found to contain about 0·25 per cent. carpaine, calculated on the dry material.

DETROIT, July, 1891.

MAGNOLIA GRANDIFLORA.

BY B. ALFRED RANDOLPH, PH.G.

From a Thesis presented to the Philadelphia College of Pharmacy.

In going down Buffalo Bayou from Houston, Texas, to Galveston Bay, a distance of about fifty miles, a person cannot realize a more beautiful scenery than is presented here by nature, with the banks of this rivulet filled with magnolia trees, their height ranging from the magnificent altitude of forty to seventy-five feet; their leaves of

[1] See AM. JOUR. PHARM., May, 1891, p. 230.

a lovely polished green, and their flowers beautiful and gorgeous and of a fragrance rendering the atmosphere rich with their delicate odor. In autumn the large green fruit, from which are suspended a number of delicate scarlet seeds hanging by a slender silken thread, again renders the tree beautiful in appearance, and the contrast with the flowers, as sometimes seen on the same tree, is quite striking.

This species has its spreading branches appear on the trunk at about twenty feet from the ground. Its habitat is Florida, Louisiana and Texas, although it is found as far north as Tennessee and as far west as California. It thrives best in sandy soil along the banks of rivers and is seldom found elsewhere. It does not bear fruit until it is about five years old.

The leaves are always alternate oval-obovate dark green above, mid rib prominent, margin entire, under surface of a light brown color and velvety appearance; when bruised, they have a very disagreeable odor and a bitter and acrid and pungent taste, which properties are lost when the leaf becomes dry. By placing a linen cloth on the under surface of the leaf and marking with a blunt instrument an indelible ferruginous mark is obtained.

The flowers terminate the young branches and appear in the spring, the buds being covered with two deciduous tough hairy scales. The petals are large oval or obovate, abruptly narrowed at the base, coriaceous and of a brilliant white color, but becoming instantly ferruginous when bruised. Letters can easily be written on them with a sharp instrument. The stamens are very numerous and much shorter than corolla.

The fruit is about three to four inches long, two to three inches wide, conical, composed of numerous dehiscent carpels arranged in a sort of imbricated spike; each carpel contains one or two seeds which after dehiscence remain suspended by slender threads, and which are the size of a pea and covered with scarlet pulp, the centre being a hard kernel, white externally and dark colored internally. The taste of the fleshy portion is exceedingly pungent, acrid and bitter, and when a ripe seed is bruised in the mouth the irritation often extends far back into the throat causing a lasting disagreeable taste, followed by incessant and painful coughing.

The seeds after falling from the fruit, if covered over with loam, begin to grow the following spring. In raising them for ornamental purpose, out of several hundred seeds planted only a small number

ever matured. On exposure to air the seeds become rancid and to preserve their germinating powers they should be kept in rotten wood or moist sand.

The bark is about half an inch thick and breaks with a short fibrous fracture; externally it is of a gray color and smooth, often covered with moss; inner surface whitish or after drying yellowish or pale brownish, smooth and very finely closely striate. The dry bark has scarcely any odor and a slight bitterish taste, but the fresh bark is of a strong aromatic odor and bitter acrid and astringent taste.

It is used, domestically, in infusion or decoction for the treatment of rheumatism and malaria, and the tincture made by macerating the bark in brandy or whiskey is said to have produced cures in chronic cases of chills and fever when quinine had failed.

The bark which had been collected in November, 1890, yielded an infusion of an acid reaction, and giving no precipitate on the addition of alcohol. The tincture became milky when mixed with water. By distillation with water a little volatile oil was obtained. The presence of tannin, starch, saccharine and coloring matter was shown, and on incineration 6½ per cent. of ash was left.

OPIUM ASSAYING ONCE MORE.

By Alfred Dohme, Ph.D.

In a previous article in this Journal * I have reported upon some comparative work done upon the methods of Flückiger, Squibb and the U. S. Pharmacopœia for the assaying of opium. Inasmuch as the method of Dieterich has come into some prominence due principally to its adoption by the German Pharmacopœia I decided to make some comparative experiments with it, comparing it principally with our present officinal process. The method of Dieterich was then also critically examined as to its complete or incomplete exhaustion of the opium under varying conditions.

A large supply of Smyrna opium (opium A) was dried at 100° C.

* American Journal of Pharmacy, vol. 63, p. 161.

In my previous article on opium assaying, I stated that the residues remaining after treatment of the morphine with lime water were narcotine. Not being in the scope of my work, I did not especially examine these residues save to test them for narcotine, in which case I obtained an affirmative test. I have since, however, examined the matter more thoroughly, and find that the residue contains some narcotine at times, but is mainly and usually made up of calcium meconate.

for eight hours and after powdering very finely, again dried for five hours at 100° C. In a second series of experiments, the opium, also a Smyrna opium (opium B), was dried at 60° C. The method of Dieterich was used in both modifications so that in the first series of experiments, the method as laid down in the German Pharmacopœia was used while in the second series the modified and shortened method as last published by Dieterich[1] was adopted. The first three results by the U. S. P. process agreeing so well, it was thought unnecessary to obtain any more by that method.

The morphine obtained by either method is quite pure, but it appears to be more nearly colorless in case of the U. S. P. than in case of the Dieterich process.

The following are the results obtained:

	SERIES I (Opium A.)	
	U. S. P. Per Cent.	*Dieterich.* Per Cent.
1,	12·51	10·79
2,	12·60	15·32
3,	12·55	13·17
4,	—	12·75
5,	—	10·96
6,	—	11·46
7,	—	10·55
8,	—	10·20
9,	—	11·37
10,	—	10·86
11,	—	12·25
12,	—	13·60
13,	—	13·06
14,	—	12·28
15,	—	12·05
16,	—	12·38

	SERIES II (Opium B.)	
	U. S. P. Per Cent.	*Dieterich.* Per Cent.
1,	12·87	13·17
2,	13·30	13·78
3,	13·16	12·49
4,	13·48	15·25

In experiments 8, 9 and 10 by Dieterich's method, the entire fluid was taken instead of an aliquot part and proportionately more ether and ammonia was added. In experiments 11 and 15 the usual method was used, but the opium was allowed to stand in contact with the water for twenty-four hours, instead of one, as required by the method.

In experiments 12, 13 and 14, the entire fluid was taken instead of an aliquot part and it was also allowed to stand twenty-four hours in contact with the opium before filtering.

[1] Helfenberger Annalen, 1890. pp. 66–68.

From these facts and figures, the following conclusions may be drawn: That the method of the U. S. Pharmacopœia, 1880, gives results that do at any rate agree with one another, if not with the truth as has been claimed, so that reliance can be placed upon them; while Dieterich's method gives results that vary so greatly from one another that hardly any reliance can be put in them.

That using the entire extracting fluid in Dieterich's method instead of an aliquot part does not improve the yield of morphine (see experiments 8, 9 and 10)—but:

That—a longer and hence more intimate and complete contact of the water with the opium does improve the yield of morphine (see experiments 12, 13 and 14); and that the results by Dieterich's method vary so very greatly among one another that it is hardly justifiable to draw any conclusions from them.

ON DIETERICH'S MORPHIOMETRIC METHOD.

By J. B. Nagelvoort.

The preface of the "Helfenberger Annalen" for 1890 is not dated, as was the case in the two preceding editions; but since the present issue contains several papers which were read in Berlin, Germany, April 2, 1891, it is evident, that the volume could not have reached me here in Detroit, before the publication of my paper in *Pharm. Weekblad* (Holland), May, 1891. In this paper the most important objections to the Helfenberg method of morphine determination have been considered. As early as the beginning of summer, 1890, I communicated, privately, to Prof. Maisch the results of a number of assays made by that method, which had led me to the conclusion that the method could not be implicitly relied upon in all cases.

On p. 76 of the "Helfenberger Annalen" for 1890 is given a modification of the assay process, which is translated as follows: "Based upon later observations, we find it necessary to add the following: *Not every opium powder* used for assaying yields after maceration sufficient filtrate for using, therefrom, 42 gm., and it may happen that only 38 to 39 gm. are obtained by spontaneous dropping. In such a case, the residue upon the filter is to be moderately pressed with a thick glass rod, whereby the deficient amount of liquid will be caused to drop off."

As the Helfenberg method has been adopted by the German

Pharmacopœia for the assaying of opium, its shortcomings—whatever they may be—should be known.

In a reference to my paper on the assaying of opium preparations in the AMER. JOUR. PHAR., August, 1890, the foot-note, on page 409, is quoted by the "Helfenberger Annalen" for 1890, page 69, in a very incorrect manner, which is best shown by placing the English version of the quotation along-side of the foot-note, viz:

From *Am. Jour. Ph., 1890, p. 409.* Dieterich's unfavorable results are *unfairly* obtained. He exhibits, in the Helfenberger Annalen for 1889, a brilliant array of 54 comparative assays, of which not a single one *is made according to Flückiger.*

From Helfenb. Ann., 1890, p. 69 (translation). Dieterich's unfavorable results are *dishonestly* obtained. He exhibits, in the Helfenberger Annalen for 1889, a brilliant array of 54 comparative assays, of which not a single one *agrees with Flückiger.*

Dieterich choose to translate "unfairly" by "unredlich;" but this German word signifies in English *dishonest*—and this word is *not* synonymous with unfair.

DETROIT, August 3, 1891.

GERMAN PHARMACISTS AND PHARMACIES.

BY ALFRED DOHME, PH.D.

Much has recently been said and written in disparagement of our schools of pharmacy and especially of our pharmacies, so that the latter have even been termed grog-shops, groceries and confectioneries. The greater part of this pessimistic philosophy and eloquence comes, if one will take the trouble to investigate matters slightly below the surface, from an element among our people which is foreign in birth as well as sentiment to this our native land. A man naturally clings to his native home all during life, no matter how long a time has elapsed since he last saw and gathered around it, especially so, however, if he had left it during youth or early manhood. When, hence, he once again returns to said home and country, everything looks splendid; he sees things through flawless glasses and he has no fault to find with anything therewith connected. Pharmacists are no exception to this rule and they who came over from some part of Europe to try their fortune on these shores, on returning thither find everything more advanced, better and more complete than over here in this fast country. It is from these men that we learn, and they often take pleasure in airing their opinions while abroad as well as at home, sometimes even publicly,

that we should model our drug stores after those of the country from which they come, and that our pharmacies are cigar stores and saloons while our pharmaceutical colleges are druggist mills. What value is to be placed on their statements let each man decide for himself. Suffice it to say that pessimistic philosophy has never yet done the world much positive good or advanced it, while it has in many instances harmed it considerably.

While in Germany, the writer made many observations on the mode of teaching and practising pharmacy, especially during the last year when during the course of one semester he had occasion to work in the same laboratory with the candidates of pharmacy, question them as to their information and attend their examinations.

The general standing of the students of pharmacy is certainly no better, in fact rather below that of the disciples of Æsculapius in our country. The men spring from the lower middle and lower classes as a rule and stand lowest as a class in popular estimation among the university students. They should not properly be placed in this latter category for they are not compelled to pass the same examinations as the other university students do, their so-called "Einjähriges Examen"* enabling them to pursue their studies at the university in pharmacy. They must spend at least three semesters (one and a half years) at the university and do spend them, usually as follows: First semester, lectures on inorganic chemistry and botany, with laboratory work in qualitative analysis; second semester, lectures on pharmaceutical chemistry, organic chemistry and materia medica, with laboratory work in quantitative analysis; and third semester, lectures on pharmacognosy and physics, with laboratory work in pharmaceutical chemistry. A course in the physical and botanical laboratories is open to them, but few of them take advantage of it. The final examinations are oral, the candidate putting in an appearance in a black suit with white necktie and white gloves and looking about twice as miserable as candidates for examination usually do. Before a man can come up for his examination he must have served an apprenticeship extending over a period of six years. The facilities offered the student, both in the way of lectures and laboratory work, are perhaps better than those

* An examination which enables them to serve one year in the army instead of three as the law requires.

of our colleges because they are those of the universities and usually rather good. The amount of time spent at their work in the laboratory is greater than with us, for they spend their entire day during five days in the week either at lectures or in the laboratory, thus enabling them to devote their entire attention and thought to their studies. It must hence be admitted that the facilities offered a German student of pharmacy are better and more complete than ours here; but it is just as true that the men do not take advantage of the same, for although they spend considerable time in the laboratory and lecture room they spend remarkably little at their books, so that nearly every evening finds them with their university chums in some restaurant or other delectable spot about town. The result is that they indulge in but little studying and reading until within a month or so of their examination, when they strive to make up for lost time. This is, however, impossible for an average student and the display of ignorance many of them make is at times lamentable in the extreme. The German student of pharmacy is hence by no means a paragon for his American confrère to pattern after.

Now a few words regarding the German pharmacies. These are, as a rule, not to be compared with ours in point of completeness, accommodation or general appearance. They do not, to be sure, sell soda water, cigars or confectionery, but they do look all the more sombre and uninviting for the absence of an ornamental soda fountain or a tasty cigar case and perfumery counter. There is certainly nothing inviting looking about an European pharmacy; in fact, one frequently rather feels more like as if he were entering an undertaker's establishment. This cannot be said of any of our drug stores. Quite on the contrary, a mingled feeling of comfort, pleasure and refreshing ease comes over one whenever he enters a first-class pharmacy in this country. Competition is the life of trade as it is the keystone of advancement in every phase of life to-day. There is no competition among German pharmacists, and the result is they are, as a rule, not as accommodating by far as ours are. Although there may be room for improvement in many of our colleges of pharmacy, this is rapidly being appreciated and acted upon, and our pharmacists have no reason to consider themselves at all behind the times or below the standard of other countries.

BALTIMORE, August 8, 1891.

THE CHEMISTRY AND CLINICAL VALUE OF STERILIZED MILK.

Of late years a great deal has been written upon the dangers of transmission of infection by means of milk derived from diseased animals or improperly handled or exposed, and, as a consequence, sterilization has been regarded as a necessity; but the milk, after sterilization has been found to be so changed in that process that of late a reaction has set in, and the question has arisen whether or not the desired immunity could not be better attained by some other means. In the *American Journal of the Medical Sciences* for June, 1891, Professor A. R. Leeds and Dr. E. P. Davis contribute a valuable paper as to the nature of the changes effected in milk by sterilization and the clinical value of sterilized milk.

Professor Leeds is well known as an authority on the subject of milk analysis, and his conclusions are extremely interesting and valuable. Dr. Leeds finds that raising the temperature to the boiling point, and still more the retaining of it at that point for a lengthened period, as in sterilization, converts a considerable portion of the soluble into insoluble proteids. The effect of heat is greatest on the galactozymase—the ferment found in raw milk, which has the power of liquefying starch; even raising milk for a moment to the boiling point destroys this ferment action. Experiments made to contrast the behavior of sterilized milk with raw milk, when subjected to the action of rennet, acid, artificial gastric juice, and pancreatic juice, show that the casein, while not coagulated by the heat, is, nevertheless, less readily coagulated by rennet, and yields slowly to the action of pepsin and pancreatin. Moreover, a part of the lactalbumen of the milk is coagulated, although only partially so. Its effect, however, is to thicken the milk and intensify its colloidal (ropy or mucilaginous) character. The fat globules are likewise somewhat affected by the heat, and the coagulated proteid matters attach themselves to the fat globules, and probably have an influence in bringing about the difficulty with which the fat is assimilated.

Finally, milk-sugar, Dr. Leeds finds, is completely destroyed by long-continued heating, and is probably affected to a certain extent during the interval ordinarily allowed for sterilization. Dr. Leeds thus shows that sterilized milk is less readily and less perfectly digestible than raw milk, and if sterile milk is sought for, the present desideratum is to obtain it either directly from

the animal or by a process not accompanied by such serious drawbacks.

Dr. Davis confirms the opinion which has gradually gained ground that while sterilized milk may be useful as a remedy in various bowel complaints, it is not sufficient to sustain life. If sterilized milk is desired, Dr. Leeds recommends that, after being rendered feebly alkaline with lime water, the milk should be heated to 155° F. for six minutes; or, still better, the treatment in alkaline solution, with pancreatin at 155°, followed, if not immediately used, by momentary heating to the boiling-point. Either of these procedures Dr. Leeds maintains, will render milk sterile without detracting from its digestibility.—*Therapeutic Gazette*, July, 1891.

A NEW TEST FOR ALBUMIN AND OTHER PROTEIDS.[1]

By John A. MacWilliam.

The reagent is a saturated watery solution of salicyl-sulphonic acid, a white crystalline substance readily soluble in water and alcohol. It precipitates all classes of proteids: 1, native albumins (egg-albumin and serum-albumin); 2, derived albumins (acid-albumin and alkali-albumin); 3, globulins (*e. g.*, serum globulin and myosin); 4, fibrin (whether held in solution by dilute alkalies or by neutral salts; 5, proteoses (albumoses, etc.); 6, peptones.

With all these the reagent at once forms a dense, bulky, white precipitate. This precipitate is not redissolved on boiling, except in the case of an albumose or peptone. The precipitate is readily soluble in a dilute alkali, provided a sufficiency of the alkaline solution be added. It is not soluble in weak acids, nor in strong acids unless a large quantity of strong acid (such as nitric) is added.

The method of testing is as follows: Take a small amount of urine (for example, 20 minims), preferably in a very small test-tube, and add a drop or two of a *saturated* watery solution of the reagent. If the urine is strongly alkaline an extra drop or two of the acid should be added, and if no opalescence or precipitate occurs it is well to test the reaction with litmus, and make sure that the urine has been made strongly acid. On adding the reagent, shake the tube quickly so as to mix its contents; then examine at once. The occurrence of an opalescence or cloudiness immediately or within a

[1] *Brit. Med. Journ.*, No. 1581; *Amer. Journ. Med. Scien.* Aug., 1891.

very few seconds (say two or three) is a test for proteids, intermediate in delicacy between the cold nitric acid test, on the one hand, and the acetic acid and heat test (under favorable circumstances), on the other. The development of an opalescence some time after (for example, one-half to two minutes) is a more delicate test than even acetic acid and heat, and shows the presence of minute traces of proteid, which are probably insignificant from a clinical point of view, as a rule.

Next heat the tube to boiling-point. If the opalescence or precipitate is caused by the ordinary "albumin" commonly present in albuminous urine, it does not disappear on heating; but, on the other hand, becomes markedly flocculent. But if the precipitate or opalescence is due to the presence of albumoses or peptones, it clears up on heating (before the boiling-point is reached) and reappears when the tube cools.

The author is satisfied from careful experiments, that—1, the precipitate is really a proteid one; 2, that it is always obtained when proteid is present in the various abnormal conditions of urine which may have to be examined; 3, that the precipitate cannot be caused by any other non-proteid constituent of the urine. Cloudy phosphatic urine clears adding the reagent.

Urine containing excess of urates gives no precipitate, nor does proteid-free bilious urine. As regards the presence of a large quantity of mucin this is not likely to prove a scource of error. Moreover, it is probably only in the case of alkaline urine, when there is at the same time a marked irritation of some part of the urinary passages, yielding a greatly increased mucous secretion, that the amount of mucin in the urine can be sufficient to come into question at all. But in such conditions of the urinary tract the detection of a trace of albumin is probably of no significance. Normal urine gives no reaction with salicyl-sulphonic acid.

GUM ARABIC AND GUM SENEGAL.[1]

By L. Lieberman.

The employment of gum senegal as an adulterant of, or even as a substitute for, gum arabic led the author to investigate the properties of these two gums.

Gum arabic forms rounded or angular, colorless, yellowish, or

[1] *Chem. Zeit.*, 14, 665; Jour. Chem Soc., 1891, p. 866.

brownish, and strongly-refractive little lumps; whilst gum senegal is usually in long, straight or curled cylindrical pieces, but occasionally in mulberry-shaped nodules, and is either colorless or faintly-yellow or white, like etched glass, superficially, and lustrous and transparent internally. The two gums are therefore readily detected in the uncrushed condition, but under other circumstances they require further investigation for their identification.

Water dissolves both gums, leaving a residue of wood fibres, these being usually red if from gum arabic and black from gum senegal. Potassium hydroxide and copper sulphate produce a blue precipitate in both solutions; the gum arabic precipitate is more considerable than the senegal precipitate. Moreover, the former is coherent, and rises to the surface, whereas the latter is more flocculent, and remains disseminated in the liquid. The precipitates are only very slightly soluble on warming, and are not reduced even on boiling. Under similar treatment, dextrin also gives a bluish precipitate insoluble in the cold, but soluble to a clear, dark-blue solution on warming, which solution is completely reduced by prolonged boiling. By heating with dilute potassium hydroxide for some time, solutions of gum arabic or dextrin become amber-yellow; solutions of gum senegal, on the other hand, scarcely alter, or are but very faintly yellow.

Mixtures of the gums arabic and senegal behave, with potassium hydroxide alone, like gum arabic; with potassium hydroxide and copper sulphate like gum senegal. The blue precipitates from mixtures of dextrin with gum arabic or gum senegal are reduced on boiling, provided the quantity of dextrin is not too small; but when the latter is the case, after thorough warming, the precipitate must first be filtered off, then, on boiling the filtrate, reduction takes place if dextrin is present. When both gums as well as dextrin are present, the precipitate is washed, dissolved in dilute hydrochloric acid, and the gums precipitated by means of a large excess of alcohol; when settled, they are washed and examined by the above methods.

The examination of a sample of gum arabic may be conducted in the following manner: Dissolve the powdered substance in lukewarm water, examine residue—any gelatinous matter indicating foreign gums; treat the solution with excess of potassium hydroxide and copper sulphate, warm, filter, and examine for dextrin and senegal as described above.

Gum senegal has been stated to be more hygroscopic than gum arabic; but on drying at 105°, the former lost 13·39 per cent., the latter 14·56 per cent., and, on exposure to the moist atmosphere, the former reabsorbed 6·15, the latter 6·34 per cent. of water.

NOTE ON SANDAL WOOD.*

By M. Adrian.

Sandal wood has been known in India from the highest antiquity; it is mentioned under the name "chandanna" in the "Nirukta," or writings of Yaska, the most ancient Vedic text known, dating the fifth century B.C. At that time, and for long after, it was specially utilized as a perfume, as well as in burial rites, either to embalm the dead or to feed the funereal pile. Even now this wood is used for the same purpose in India, and the honor rendered to the dead is proportional to the number of logs of sandal wood upon the pile.

The Greeks and Romans seem not to have been acquainted with sandal wood. In any case it is not mentioned in their writings, and the first European writer who speaks of it is Constantinus Africanus, of Salerno, in the eleventh century. In the fifteenth, Ebn Serapi, surnamed Serapion the younger, mentions three kinds, red, yellow and white.

Already at this time the three kinds of sandal wood were indicated as being kept by the apothecaries, but it was not until later that the true medicinal properties of the wood were known. In 1750, Dutch travellers visiting the Moluccas brought back and communicated to Rumphius, of Rotterdam, a remedy used by the natives against blennorrhagia, which consisted of a maceration of disintegrated sandal wood. Rumphius studied this product, and it was he who first gave, in his work entitled "Herbarium Amboinense," a detailed description of *Santalum album.*

However, the favor accorded at first to sandal wood was of short duration, and as a medicine it had fallen completely into oblivion, when in 1865, in the United States, Dr. Henderson, in order to avoid the disagreeable repetitions and intestinal disturbances that accompany the administration of copaiba and cubebs, thought of substituting it by oil of sandal wood. The experiments made by him in this direction having been crowned with success, he com-

**Journ. de Pharm. et de Chim.*, July 15, Supp., p. vii; reprinted from *Phar. Jour. and Trans.*, July 18, 1891.

municated the results obtained to the *Medical Times and Gazette* of June 3, 1865.

In the month of July following mention was made in the Société de Chirurgie of the employment of oil of sandal wood in blennorrhagia. At that time Dr. Panas made some experiments with capsules containing 40 centigrams each in the Lariboisière hospital, and on the 20th of September of the same year he communicated to the Société de Chirurgie the results obtained, stating that oil of sandal wood is very well tolerated by the most delicate stomachs and does not occasion any disturbance either of the digestive canal or of the kidneys. Some months later Dr. Simonet confirmed the statements made by Dr. Panas.

Formerly three kinds of sandal wood were recognized:

(1) *Red sandal wood*, from *Pterocarpus santalinus* (Leguminosæ). This wood possesses no medicinal properties and is used exclusively in dyeing on account of the red coloring matter it contains.

(2) *White* and (3) *yellow sandal wood.* The last two kinds are the produce of several trees of the genus *Santalum* (Santalaceæ). Certain authors have stated that they represent one the sap wood and the other the heart wood; but it has long been recognized that the depth of color of these woods depends solely upon the species that yields them, and the two sorts are in fact confounded under the same name.

This wood is very hard, of a more or less dark yellow color, and has a very pronounced aromatic odor. The hard trunk wood is alone sent to Europe, the branches and white wood having no value; the roots are utilized in the country where they are grown in the preparation of essential oil.

Sandal wood came originally from India. The *Santalum album* is still cultivated there in the mountains of Mysore and at Arcot in Madras. The cultivation is protected by the government, which decides every year the number of trees to be cut down. The seeds of the tree are sown together with capsicum. The latter spring up very quickly, and the young capsicum plants protect the young sandal plants from the fierceness of the sun. They also serve the purpose of providing nourishment, as the young sandal plants, being parasitic, fix themselves upon the roots of the capsicum plants and draw from thence the necessary juices until they have attained a development, when they can nourish themselves directly by the aid

of their own roots. When the trees have attained an age of twenty to thirty years they are cut down, and the trunks are freed from white wood and cut into small billets, which are sent to China or Europe. The roots are cut into chips and distilled on the spot by a very primitive process. The two ports of exports from India of sandal wood and oil are Bombay and Mangalore.

The actual quantity of sandal wood oil exported from India tends to diminish. It is a strongly colored oil and always adulterated, probably with castor-oil.

Sandal wood is also met with in the Sandwich Islands, where it is yielded by *Santalum Freycinetianum*, and in the Fiji Islands, where the *Santalum Yasi* is found.

In Australia an essential oil is obtained by the distillation of *Fusanus spicatus* and *F. acuminatus*, which is beginning to arrive in the European markets, but which is less odorous, like the wood from which it is obtained.

Lastly, there is received from Venezuela, but in small quantities, an "oil of sandal wood," known as West Indian, and which is indicated in the price currents as "W. I."

The best oil is, without doubt, that which is prepared in Europe, principally in France and England. The billets are reduced to shavings and distilled with water in large apparatus. The oil, being mixed in the wood with a resinous substance, separates with difficulty and distils over only after a time, when it is collected in a series of Florentine receivers, where it separates slowly from accompanying water. It is afterwards clarified by paper filtration. In this way is obtained an oleaginous liquid, having a density of about 0·975 (the B.P. indicates 0·960 and the U.S.P. 0·945), lævogyre, neutral to litmus, soluble in alcohol, ether, and chloroform, and nearly insoluble in water. Exposed to the air oil of sandal wood oxidizes and resinifies; on the other hand, it gives reactions similar to oil of turpentine and other hydrocarbon essential oils.

The consumption of sandal wood oil is an increasing one, and its high price presents naturally a temptation for fraud. It is not rare to find this essential oil in commerce mixed with fixed vegetable or mineral oils of far inferior commercial value. This addition is easily detected, for these fixed oils are usually lighter than essential oil of sandal wood, and diminish consequently the density when mixed. Further, if a drop of suspected oil be placed on a piece of unsized

paper, any fixed oil present will not volatilize, but leave a permanent stain.

A sophistication more difficult to recognize consists in the admixture of essential oil of cedar or copaiba, either made after distillation, or, as is sometimes practised, by distilling the cedar and sandal woods together. In this case it is not easy to detect the fraud, especially upon a brief examination. It can, however, be discovered with the aid of the polarimeter, as the addition of either cedar or copaiba oil to oil of sandal wood diminishes its rotatory power.

OLEFINIC CONSTITUENTS OF ETHEREAL OILS.[1]

By F. W. Semmler.

Geranaldehyde, $C_{10}H_{16}O$, boils at 224–228°, under a pressure of 760 mm., and at 110–120° under a pressure of 12 mm.; the sp. gr. is 0·1972 at 15°/15°. The compound is optically inactive; the refractive index indicates the presence of two ethylene bonds, and this view is supported by the formation of a *tetrabromo*-additive compound which has not yet been obtained in crystals. Hydroxyl may be substituted for the bromine atoms, and the products thus obtained are being further investigated.

Orange oil appears to contain from 0·5 to 0·75 per cent. of oxygen; its sp. gr. is 0.8435 at 20°/20°; on treatment with hydrogen sodium sulphite, a crystalline compound is formed; on decomposing this and distilling the oily product, geranaldehyde is obtained together with a very small quantity of a lower boiling aldehyde. "Citral" is the technical term applied to an ethereal oil which is contained to the extent of 6–8 per cent. in lemon oil; this substance proves to be identical with geranaldehyde, which is also found in a number of other ethereal oils.

On heating geranaldehyde with hydrogen potassium sulphate for 20 minutes at 170°, and distilling the product in a current of steam, cymene, $C_{10}H_{14}$, is obtained, and is regarded as being formed by elimination of water from the aldehyde.

Coriander oil consists of terpenes and about 90 per cent. of another substance which is termed coriandrol, and may be readily separated by distillation under reduced pressure. *Coriandrol*, $C_{10}H_{18}O$, boils at 194–198° under a pressure of 760 mm., and at 85–90° under a pressure of 20 mm., the sp. gr. is 0·8679 at 20°/20°,

[1] *Berichte*, **24**, 201–211; reprinted from Jour. Chem. Soc., 1891, p. 539.

and the molecular refraction 49·07; this points to the existence of two ethylene unions in the compound. It combines with 2 molecules of bromine, and on treatment with silver oxide, a hydroxyl derivative is formed.

Linaloe oil appears to be a mixture of several compounds, but no terpenes could be detected. The principal constituent, which is termed *linaloöl*, boils at about 195–190° (? 185–190°), and has a sp. gr. 0·8702 at 20°/20°; the molecular refraction is 49·33; the compound combines with 4 atoms of bromine and resembles geraniol.

A sample of "German melisse oil" gave a compound with sodium hydrogen sulphite; this was decomposed in a current of steam; the resulting product has the formula $C_{10}H_{18}O$, and boils at 204–209°; the sp. gr. is 0·8681 at 15°, and the molecular refraction 48·59. It combines directly with 2 atoms of bromine. On treating the compound $C_{10}H_{18}O$ with silver oxide, the corresponding *acid*, $C_{10}H_{18}O_2$ is obtained, which is liquid; the *silver salt* is white. On oxidation, the aldehyde yields isovaleric acid.

The above compound $C_{10}H_{18}O$ is identical with a technical product termed "citronellone" and with a compound with the same name prepared by Gladstone and Wright; it is also probably the same as the citronellic aldehyde of Dodge (compare Am. Jour. Ph., 1890, 356).

The author applies the term "olefinic camphenes," to compounds of the formulæ $C_{10}H_{20}O$, $C_{10}H_{18}O$, $C_{10}H_{16}O$. These, which are always open chain alcohols, aldehydes, or ketones, have a sp. gr. of 0·86 to 0·90 at 20°/20°, and a higher refractive power than the isomeric compounds with closed chains.

DIGITONIN AND DIGITOGENIN.[1]

By H. Kiliani.

The author has shown in a former communication (1890), that pure commercial digitalin, when heated with dilute hydrochloric acid, gives, besides dextrose and galactose, a large quantity of digitogenin, $C_{15}H_{24}O_3$.

Digitonin is best obtained from commercial digitalin by extraction with 85 per cent. alcohol. Digitalin (1 part) is dissolved in 85

[1] *Berichte*, **24**, 339–347; reprinted from *Jour. Chem. Soc.*, 1891, p. 576.

per cent. alcohol (4 parts) at 50–60° and the solution allowed to crystallize slowly. The crude product thus obtained is dissolved in 12 times its weight of boiling alcohol (85 per cent.), heated for two minutes with animal charcoal, and filtered; by rubbing the sides of the beaker as the solution cools, the product is obtained in nodular aggregates of slender needles. The crystals are, however, more compact and the product purer if the solution is allowed to cool very slowly without rubbing the sides of the beaker. Digitonin crystallizes easily from 85 per cent. alcohol, whilst from stronger alcohol it is only obtained in the amorphous state, begins to soften at 225°, is completely melted at 235°, and is lævo-rotatory; for a 2·8 per cent. solution in 75 per cent. acetic acid, $[\alpha]_D = -50°$. The amorphous digitonin of Schmiedeberg dissolved in cold water in all proportions; the crystalline substance is sparingly soluble in water; on heating, it dissolves more easily, but does not crystallize on cooling, and the solution always shows an opalescence. With concentrated sulphuric acid, it gives a red solution; the addition of a drop of bromine-water greatly intensifies the reaction. Concentrated hydrochloric acid gives a colorless solution which, after a time or on heating, turns yellow and then red. Heated with dilute hydrochloric acid under the same conditions as were before given for digitalin, it yields nearly the calculated quantities of digitogenin, dextrose and galactose. The digitogenin obtained in this way was identical in every respect with that formerly obtained from digitalin.

Derivatives of Digitogenin.—When digitogenin is heated in a sealed tube with concentrated hydriodic acid and red phosphorus, a large quantity of a resin containing iodine is formed; but neither methyl nor ethyl iodide.

Acetyldigitogenin, $C_{15}H_{23}O_3Ac$, is obtained by heating digitogenin (1 part) with anhydrous sodium acetate (1 part) and acetic anhydride (6 parts) in a reflux apparatus for one hour, and pouring the bright red solution in a fine stream into a large quantity of water. It crystallizes from a small quantity of absolute alcohol in beautiful needles, melts at 178°, and is extremely soluble in warm alcohol, ether and acetic acid. Instead of sodium acetate, sulphuric acid can be employed as a condensing agent; when zinc chloride is employed, amorphous compounds which were not examined are obtained. The author points out that the formation of a monacetyl derivative from

digitogenin does not agree with the production of two sugars from digitonin, which latter fact points to the existence of two hydroxyl groups in digitogenin.

Digitogenin on oxidation yields, according to the conditions, three acids, which the author names respectively digitogenic, oxydigitogenic and digitic acids.

Digitogenic Acid, $C_{14}H_{22}O_4$, is prepared by slowly adding chromic acid (0·7 part dissolved in 1·4 parts of water and 7 parts of acetic acid) to a solution of digitogenin (1 part) in acetic acid (30 parts). As soon as all the chromic acid is reduced, an equal volume of water is added, and the mixture repeatedly extracted with ether. The ethereal solution is allowed to remain for 24 hours, poured off from the deposit which is formed, the ether distilled off, and the acid residue evaporated on the water-bath until a crystalline crust forms on the liquid; the product crystallizes after 12 hours. The yield amounts to 60 per cent. of the digitogenin employed. It crystallizes from absolute alcohol in colorless needles or thin prisms, begins to melt at 146°, and is completely melted at 150°, becomes strongly electric when rubbed, tastes extremely bitter, and is easily soluble in chloroform and hot glacial acetic acid, less easily in 50 per cent. acetic acid, more sparingly in cold alcohol and ether, and insoluble in water; when heated with water, it melts. When moistened with dilute alcohol, it has a distinctly acid reaction. It dissolves easily in alkali hydroxides and carbonates. The *magnesium salt* $(C_{14}H_{21}O_4)_2Mg$, prepared by adding an excess of dilute magnesium nitrate (1 : 10) to a very dilute neutral solution of the acid, separates as a crust consisting of aggregates of minute needles on allowing the mixture to remain for 24 hours. The *calcium* salt is similar to the magnesium salt. The bye-products of the oxidation with chromic acid probably contain formaldehyde or formic acid, as no evolution of carbonic anhydride was observed. The mother liquors contained a small quantity of an aldehydic or ketonic compound and a large quantity of an acid of high molecular weight which yields no crystalline derivatives.

Oxydigitogenic acid, $2C_{14}H_{20}O_4 + H_2O$, is prepared by dissolving digitogenic acid (1 part) in potash (1 : 10) (10 parts), diluting the solution to 100 parts, and adding a solution of potassium permanganate (1 : 50). When the oxidation is finished, the solution is decolorized with a few drops of alcohol, filtered, one-third the weight

of 93 per cent. alcohol added, and the acid precipitated with 50 per cent. acetic acid. In this way it is obtained crystallized in nodular aggregates of needles, which begin to melt at 250°; it is very sparingly soluble in alcohol and acetic acid, and becomes strongly electric when rubbed. The yield amounts to 70 per cent. of the digitogenic acid employed. The *magnesium* salt, $(C_{14}H_{19}O_4)_2Mg$, is very sparingly soluble and crystallizes in aggregates of small needles.

Digitic acid, $C_{10}H_{16}O_4$, is formed, together with oxydigitogenic acid, by the oxidation with permanganate of digitogenic acid dissolved in 3 parts of potash. When the oxidation is ended, the solution is decolorized with a few drops of alcohol, filtered, ¼ the weight of 93 per cent. alcohol added, and the acids precipitated with hydrochloric acid; the precipitate, which consists of oxydigitogenic acid mixed with some digitic acid, is filtered off rapidly; the filtrate after a time deposits most of the digitic acid in aggregates of beautiful needles. If, however, a separation of the two acids is not obtained in this way, they are dissolved in potash, the solution diluted until it contains 1 per cent. of acid, and fractionally precipitated with hydrochloric acid, when oxydigitogenic acid is precipitated first. A separation by fractional crystallization from alcohol and acetic acid is not possible, although the solubility of the two acids is very different. Digitic acid melts at 192°, dissolves easily in alcohol, chloroform and acetic acid, and crystallizes readily from boiling 50 per cent. alcohol, but not from strong alcohol. The *barium* salt, $(C_{10}H_{15}O_4)_2Ba + 6H_2O$, prepared by adding barium chloride to a solution of the potassium salt, crystallizes in nodular aggregates, and is somewhat sparingly soluble in water. The *potassium* salt also crystallizes well and is extremely soluble in water.

If the acid is dissolved in decinormal potash in the proportion, $C_{10}H_{16}O_4$: 1KOH, and phenolphthaleïn and a few drops of alkali are added, the red color remains both when the solution is allowed to stand and when heated; hence the acid is not a lactone.

Oil of Sandalwood was discovered, accidentally, by Curtin, to be a successful alleviant for some obstinate coughs. It should be given on loaf sugar, or floated on hot or cold water. It acts both locally and generally.—*University Med. Mag.*, August 1891, p. 726.

ALKALOIDS OF THE ROOTS OF SANGUINARIA CANADENSIS AND CHELIDONIUM MAJUS.[1]

By G. König.

The roots of *Sanguinaria canadensis*, a native of North America, and the sanguinarine of commerce contain several alkaloids, including *chelerythrine*, which is present in greatest quantity, *sanguinarine*, *γ-homochelidonine*, and *protopine*.

Chelerythrine crystallizes with a molecule of alcohol, which is not separated at a temperature of 150°; the formula is $C_{21}H_{17}NO_4 + C_2H_6O$; melting point 203°. It is identical with the alkaloid which the author separated from the celandine, *Chelidonium majus*. The *aurochloride*, $C_{21}H_{17}NO_4,HAuCl_4$, melts at 233°; the *platinochloride* is $(C_{21}H_{17}NO_4)_2,H_2PtCl_6$; the *hydrochloride* crystallizes out of aqueous solution with 5 mols. H_2O, and from alcohol with 4 mols. H_2O. The salts are lemon-yellow.

Sanguinarine, $C_{20}H_{15}NO_4$, is very similar to chelerythrine in its properties; it crystallizes with ½ mol. H_2O, and melts at 211°; its salts are red. The *hydrochloride*, $C_{20}H_{15}NO_4,HCl + 5H_2O$, the *nitrate*, $C_{20}H_{15}NO_4,HNO_3 + H_2O$, the *aurochloride*, $C_{20}H_{15}NO_4,HAuCl_4$, and the *platinochloride*, $(C_{20}H_{15}NO_4)_2,H_2PtCl_6$, were prepared.

The base which the author has named *γ-homochelidonine* is probably identical with that separated by Selle from *Chelidonium majus*, and its formula is probably $C_{22}H_{21}NO_4$. Its behavior with alkaloid reagents resembles that of Selle's γ-homochelidonine. The fourth alkaloid, *protopine*, was prepared from *Chelidonium majus*, *Sanguinaria canadensis*, and from opium, all the three specimens being identical. Its formula is $C_{20}H_{17}NO_5$, and it melts at 204°; the *platinochloride*, $(C_{20}H_{10}NO_5)_2,H_2PtCl_6 + 3H_2O$; and the *aurochloride*,

$$C_{20}H_{17}NO_5,HAuCl_4,$$

melting at 182°, were prepared; the *hydrochloride*, $C_{20}H_{17}NO_5,HCl$, crystallizes in two different forms, and appears to be free from combined water.

Cocaine nitrate is employed by Lavaux in connection with silver nitrate, in diseases of the genito-urinary organs, 1 gm. of each salt being dissolved in 50 gm. water. Cocaine nitrate is prepared by precipitating a solution of silver nitrate with one of cocaine hydrochloride.—*Petit Monit. de la Phar.*, June, 1891.

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[1] *Chem. Centr.*, 1891, i, 321–322; *Zeit. Naturwiss. Halle*, **63**, 369–426; reprinted from Jour. Chem. Soc., 1891, p. 843.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

For detannating medicinal wines, M. Rozsnyai uses the following method: The wine is first fortified by the addition of about 5 per cent. alcohol so as to increase the alcohol strength to 18 per cent.; the albuminoids are next precipitated by the addition of 10 to 15 grams tannic acid to the hectoliter of wine, allowing to stand 5 or 6 days and decanting; the natural as well as the excess of added tannin is then removed by the addition of gelatin in thin sheets (33 grams to the hectoliter), which is allowed to remain in the wine for 8 to 14 days. If the gelatin in solution be added to the wine a certain amount of it would remain dissolved, but added in sheets the latter merely swell and do not dissolve, at the same time effectually removing the tannin. The finished wine can be used in dispensing alkaloidal and iron salts without causing precipitates or discolorations. *Pharm. Post*, 1891, 429.

Gelatinizing of infusion of digitalis.—Continuing his research on this subject (Am. Jour. Pharm., 1891, 406), W. Braeutigam establishes the following: (1) The gelatinizing is due to a change of cane sugar; it is accompanied by the formation of small quantities of lactic acid and traces of acetic acid; the products of alteration reduce Fehling's solution. (2) The different degrees of gelatinization depend upon the quantity of the sugar and the quality and quantity of the extractive matter acting as nutriment; the extractive matter from roots and stems owing to their proportion of sugar and salts being more favorable to the change than the extractive from leaves. (3) The cultures of the Micrococcus gelatinogenus (in the previous article it was stated to be a *bacillus*, but this has been corrected and the micro-organism given the above name) as well as the gelatinized nourishing medium have been found to exert no deleterious action upon the human or animal system. (4) The gelatinized infusion still preserves its efficacy.—*Pharm. Centralhalle*, 1891, 427.

Dermatol, the new substitute for iodoform (for method of preparation see Am. Journ. Pharm., 1891, 408), owing to its non-poisonous nature and its capability of being sterilized is claimed to be superior to iodoform; forming an impalpable powder it can be applied with an atomizer. The following formulas for its application have been published: *Dermatol-ointment:* Dermatol, 10·0; lanolin, 20·0; vaselin, 70·0. *Dermatol-zinc-vaselin:* Dermatol, 2·0;

zinc oxide, 2·0; vaselin, 20·0. *Dermatol-zinc-paste:* Dermatol, 2·0 to 5·0; zinc oxide, 24·0; wheat starch, 24·0; vaselin, 50·0. *Dermatol-zinc-gelatin:* Dermatol, 5·0; zinc oxide, 5·0; gelatin, 30·0; glycerin, 30·0; distilled water, 30·0. As a *dusting powder* for fetid feet the following has been recommended: Dermatol, 20·0; talcum, 70·0 and starch, 10·0. Other forms of application for special purposes are Dermatol-collodium-emulsion, 10 per cent.; Dermatol-glycerin-emulsion, 10–20 per cent.; Dermatol-gauze, 10–20 per cent. and dermatol-suppositories.—*Pharm. Centralhalle*, 1891, 436, and *Pharm. Ztg.*, 1891, 480.

Europhen is the latest of the iodoform substitutes; chemically speaking it is isobutyl-orthocresol iodide. The method of preparation patented by the "Farbenfabriken" is as follows: Orthocresol is made to react with isobutylalcohol at higher temperatures in the presence of zinc chloride forming isobutylorthocresol; this in alkaline solution is mixed with an aqueous solution of iodine and potassium iodide, the new compound separating as a yellow, amorphous precipitate which after washing is dried in the dark. It then contains 27·6 per cent. iodine, a proportion indicating one atom iodine in combination with two molecules isobutylcresol, and has the composition $C_{22}H_{31}O_2I$. The powder adheres firmly to the skin; has an aromatic odor; it is insoluble in water and glycerin, but soluble in alcohol, ether and chloroform, hence, in collodium and traumaticin; it is also soluble in fixed oils (a 25 per cent. solution can be obtained in the cold by trituration); in these various solutions iodine is slowly liberated, especially in the presence of a little water; this possibly explains its efficacy due to the nascent iodine. Owing to this decomposition it should not be prescribed with starch, metallic oxides (zinc, mercury) or mercurial salts; made into ointments with fat, vaselin or lanolin it can be kept for considerable periods; the last named is the one to which preference is given.—Dr. F. Goldmann, *Pharm. Ztg.*, 1891, 440.

Iodine absorption of Peppermint oils.—Hugo Andres, to decide which of the several commercial varieties of peppermint oil is the best for medicinal purposes, made use of the iodine-absorptions. The iodine-absorption figures become smaller as the percentage of menthol increases, hence the oil with the smallest iodine-absorption figure would be the most valuable since it is admitted that the active constituent of peppermint oil is menthol. From 0·4–0·8 of the

samples were dissolved in 15 cc. absolute alcohol and an excess of Hübl's iodine solution added (to permanent red color) and allowed to stand for various periods of time (this to determine when the absorption was complete, it will be seen that there was no variation after 12 hours) and the excess of iodine titrated with standardized sodium thiosulphate; the absorbed iodine is calculated to 100 parts oil:

	After Standing				
Variety.	*2 Hours.*	*4 Hours.*	*8 Hours.*	*12 Hours.*	*24 Hours.*
English, ...	42·1	48·4	52·8	52·9	No change.
German, ...	63·5	66·2	67·3	69·7	69·9
American, ...	64·4	66·6	69·8	72·3	No change.
Russian, ...	84·5	92·4	96·5	96·8	" "

To determine the effect of smaller quantities of turpentine oil as an adulteration on this test, some of the English and Russian oils used above were mixed with varying amounts of French oil of turpentine. The following figures were obtained after allowing to stand for 8 hours with the Hübl's reagent:

Percentage of Oil of Turpentine.	*English Oil.*	*Russian Oil.*
5	132·0	246·8
10	158·3	258·3
15	212·8	318·4

See AM. JOURN. PHARM., 1890, 570.—*Pharm. Ztschr. f. Russl.*, 1891, 417.

Preparation of ammonium sulphide.—Instead of the usual method of saturating solution of ammonia with hydrogen sulphide, E. Donath recommends, when only small quantities of this reagent are required, to place one part powdered ammonium chloride in a retort connected with a good condenser, to add a solution of two parts crystallized sodium sulphide in five parts boiling water and distil off about one-half of the liquid in the retort; the distillate represents a very concentrated and trustworthy reagent.—*Chemiker Ztg.*, 1891, 1021.

Detection of arsenic in metallic iron.—The German Pharmacopœia contains the following test: 1 gm. powdered or reduced iron with 15 cc. hydrochloric acid and 15 cc. water in a Marsh's apparatus should evolve a gas which ignited must not deposit stains upon a porcelain capsule used in depressing the flame. In comparing this test with Bettendorf's (which is employed in the examination of most

of the other chemicals) it was noticed that the former indicated the absence and the latter the presence of arsenic in the iron; the addition first of traces of arsenious oxide to iron, subjected to the above test, and later, quantities as high as 0·1 gram arsenious oxide failed to produce the reaction. Examination of the residue insoluble in the acid showed the presence of the arsenic in the metallic state; the arsenic present in the iron as well as the added arsenious oxide had been reduced to the metallic condition by the iron or ferrous chloride and the nascent hydrogen, hence formed no volatile hydrogen compound. These same results, it was afterwards found on looking up the literature, were published by Wöhler in 1839, and must have been unknown to the revision committee.

It was found that antimony acted in the same way as arsenic in this test; the metal was always found in the insoluble residue.

If metallic zinc be added in the test (5 gm. zinc, 2 gm. iron, 30 cc. hydrochloric acid and 5 cc. water) the evolved gas will readily stain porcelain if arsenic be present.—Otto Sautermeister, *Chemiker Ztg.*, 1891, 1021.

Olive oil.—At the meeting of the Saxony Trade-Chemists, Dr. Bach gave a discourse on olive oil, stating that the iodine-absorption of the oil as published by Hübl (82·8–83 per cent.) was correct for culinary oils, but the technically important, strongly acid last-pressings varied from 81·6–84·5 per cent; there also occur in commerce oils, which by all other tests are characterized as pure, having iodine-absorptions as low as 79 per cent. (due to the presence of cholesterin in larger quantity) and as high as 89 per cent. (caused by the addition of "denaturirungsmittel," i. e., substances preventing the use of the article for internal purposes, but not interfering with its use in the arts, as oils of rosemary and turpentine). The following preliminary treatment is recommended for this last class of oils before taking the iodine-absorption: The oil to be examined is placed in a water bath and stirred with about half its weight of powdered crystallized sodium carbonate; the free fatty acids react with the sodium carbonate with evolution of CO_2 and the volatile oils are dissipated; after the completion of the reaction the oil is poured off from the soap, washed with hot water and, in case it becomes turbid, dried in a drying closet until it becomes clear; it is now ready for a reliable iodine-absorption. In this treatment it was noticed that pure Malaga oils retained their green

color, whereas in artificially colored oils the green color changed to yellow.—*Chemiker Ztg.*, 1891, 1023.

Tonquinol.—(See Am. Journ. Pharm., 1891, 289.) For its manufacture equivalent weights of oil of turpentine and isobutylalcohol are mixed and slowly added to 5 or 6 times its volume of concentrated sulphuric acid, preventing any rise in temperature; after one or two hours this mixture is poured into 5–10 times its volume of fuming nitric acid; when the nitrating is complete, the mixture is poured into a large excess of water which causes precipitation of the nitro-derivative; it is collected on a filter and washed to neutral reaction. It forms a pale yellow powder, of strong musk odor, melting at 70° C.—*Pharm. Centralhalle*, 1891, 459.

Tannin extraction.—A patent has been granted the firm J. D. Riedel, of Berlin, for the following method: The properly comminuted and, if necessary, dried material is placed in a suitable continuous extraction apparatus and exhausted with a solvent for resins, waxes, fats and chlorophyll like ether, carbon disulphide, amyl alcohol, benzol, benzin, etc.; by heating the solvent is completely removed from the material and the tannin then extracted by percolation with water; by dialysis the crystallizable salts and gallic acid are removed as rapidly as possible from the percolate to prevent change in the tannin and then the dialyzed solution is evaporated.—*Pharm. Centralhalle*, 1891, 419.

Oil of rose.—An examination of the German as well as the Turkish oil showed that both contained the same constituents although in different proportions: (1) Ethyl alcohol found in the fraction boiling between 70 and 100° C.; (2) Rhodinol, this constitutes the bulk of the oil and is the odorous constituent; *rose oil freed from stearopten* contains only rhodinol and is made by dissolving the oil in five volumes of 75 per cent. alcohol at a temperature of 75–80° C., cooling, with constant agitation, to 0° C., filtering, washing the separated stearopten with dilute alcohol, and allowing the alcohol to evaporate in vacuo at the ordinary temperature when the purified oil is left. If rhodinol be distilled in quantities greater than 25–30 gm. as much as 25 per cent. will resinify. Rhodinol has the specific gravity 0·8804–0·8813 at 15° C.; is slightly lævogyre; is soluble in alcohol, ether, chloroform, benzin, benzol, carbon disulphide and glacial acetic acid; obtained from German oil it is of a green color, from the Turkish oil of a yellow color; both have a pleasant odor

suggesting a little that of mint; it has the formula $C_{10}H_{18}O$ and differs from geraniol only by different positions being occupied by the methyl- and propyl-groups; it is a methane derivative, but by the action of dehydrating agents yields limonene and dipentene. (3) The stearopten is present in amounts varying from 20–68 per cent., oils from colder climates containing more stearopten; it is probable that the stearopten comprises a homologous series of hydrocarbons, at least two hydrocarbons having been discovered (Am. Journ. Pharm., 1891, 48). In this examination 160 grams German and 460 grams Turkish oil were used, chiefly in the study of rhodinol and in the manufacture of its derivatives.—Ulrich Eckart, *Arch. der Pharm.*, 1891, 355–389.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

ACTIVE PRINCIPLE OF ANEMONE SYLVESTRIS. M. Dupuy (*Congrès des Sociétés Savantes*) finds this to be a well-defined solid which crystallizes in needles. He says: "From a therapeutic point of view anemonin is an agent of great value, acting efficaciously in acute and chronic bronchial catarrh, and as a calmative of the spasmodic and irritative cough of pertussis. It is also of value in eye troubles dependent upon the rheumatic diathesis and possesses powerful emmenagogue properties. In elevated doses it has a considerable toxicity, causing hiccough, stupidity, trembling of the limbs, bloody dejecta, perversions of sense, convulsions and death by paralysis."—*Nouv. Rem.*, July 8.

INTOXICATION FOLLOWING THE EXTERNAL USE OF TOBACCO.—M. Auché, *Jour. de Méd. de Bordeaux*, cites the case of a man suffering from pediculi pubis who boiled 200 gm. of tobacco in 2 litres of water and rubbed it over his whole body, leaving it to dry on the skin. He was suddenly seized with vertigo, nausea, heaviness of the head, obnubilation of sight, cold sweats, extreme pallor, trembling and weakness of the limbs, etc. The extremities became very cold and purplish in color and the moisture on the skin was viscous. The man's brain "felt compressed" and the air "looked foggy" to him. His pupils were slightly dilated and retained the power of accommodation; they reacted to light; nausea and vertigo were constant symptoms. Patient complained of difficult respiration and spoke with difficulty. The heart movements were slow and weak.

A syncopal condition was constantly threatened. Reflexes and sensibility normal. These symptoms continued for three hours, when they gradually subsided. On the next day the man had a violent cephalalgia.—*Nouv. Rem.*, July 8.

VARIABILITY OF MEDICINAL STRENGTH IN EXTRACTS.—In a paper upon this subject read before the *Société de Thérapeutique* and reported in *Nouveaux Remèdes*, July 24, 1891, M. Patein formulates the following conclusions: In order to remedy the irregularity of action of the present officinal preparations we must take care: (1) To employ for pharmaceutical uses only those plants which contain a proportion of active principles which has been officially determined. (2) To conserve only those officinal preparations in which the active principles of the plants employed have undergone but slight alterations and which correspond to an official standard. (3) To employ only those active principles of plants, or those chemical products by synthesis, which have a determined elementary composition, and which respond to certain processes of chemical and physiological identification which have been officially formulated.

MASSIVE INJECTIONS of CREASOTIZED OIL.—In a communication to *La Société de Dermatologie* (reported in *La Rev. d' hyg.* and *L' Union phar.*, July, 1891), Dr. Burlureaux has constructed an apparatus by which, with the aid of compressed air, he makes hypodermic injections of "50 to 100, and even 200 gm. of creasotized oil (1 in 14 parts), equal to 3 to 14 gm. of creasote." "It is very evident," says the latter journal, "that a massive dose of creasote thrown into the blood must singularly inconvenience the bacilli." During the administration of these doses, the author nourishes the patients by injections of a pure oil. At a single sitting he has thus injected 320 gm. of the latter.

"POUDRE DE PISTOIA."—This preparation, made in a convent of Pistoia is one of the most renowned of the remedies for gout. It is sold in boxes containing 365 powders (for 30 francs), of which one is to be taken daily in hot infusion, or even a glass of cold water, the ingestion of the medicament to be followed by bodily exercise. M. Chastaing has lately analyzed the powder and the result, as follows, was given to the Paris Society of Pharmacy: Colchicum (bulbs), 20 per cent.; bryonia root, 10 per cent.; betonica, 50 per cent.; gentian, 10 per cent.; chamomile flowers, 10 per cent.; the whole to be finely pulverized; daily dose 2 to

3 gm., to be taken in the morning, fasting, suspended in water.—*Méd mod.; L'Union phar.*, July.

MICROCOCCI IN ORANGE-FLOWER WATER.—M. H. Barnouvin (*L'Union phar.*, July), referring to his previous researches on this preparation, says that he then obtained orange yellow deposits, which he now finds to consist of masses of very small yellow cells of a more or less globular form, motionless, and responding by their characters to the chromogenic bacteria described by Cohn as the micrococcus luteus, and by Schrœder as the bacteridium luteum. M. Barnouvin reminds us that at this time, when the public demand that such preparations shall be carefully watched by the pharmacist, a knowledge of these points is important.

DANGERS OF TINCTURE OF IODINE PREPARED WITH DENATURALIZED ALCOHOL.—In the *Union phar.* of July, M. Sochaczewski says that iodine prepared as above is twenty times more irritating than tinctures made with good, ordinary alcohol. From a tincture made with the impure alcohol he has extracted seven principal bodies, which all possess a more or less strongly marked irritative action. These are hydriodic acid, iodic acid, iodal, iodide of methyl, sulfocyanate of allyle (or "essence of mustard"), iodo-acetone and free acetone. He is unable to say how the sulphocyanate of allyle is produced, but thinks there is no doubt of its presence, which was indicated during analysis "by its odor *sui generis*." He says that it is not surprising that the tincture made with denaturalized alcohol is too energetic to be safely employed in certain cases.

VOLEMITE, A SUGAR FROM LACTARIUS VOLEMUS.—M. Bourquelot (*Soc. de Phar. de Paris*, June 3), showed a sample of the above, extracted by treating the plant with 90 per cent. alcohol, and then taking up the residuum several times with 95 per cent. alcohol, in order to get a pure and crystallized product. Volemite appears as colorless needles grouped in spheroidal forms about the size of a millet-seed. It fuses at 284° F. It is more soluble than mannite in both water and alcohol, has no reducing properties, does not ferment, is not modified by diluted sulphuric acid, and does not give off osazone. Its rotary power, $a_D = + 2°4$, is not augmented by the presence of boric acid, but is increased under the influence of borate of sodium. Analysis has not thus far decided whether volemite is a glucoside or a mannite, but M. Bourquelot thinks it ranges with the latter. With benzoic aldehyde and paraldehyde it gives crys-

tallized acetyls (lævogyre), which are analogous to those prepared from mannite by M. Meunier. The author stated that volemite is not *identical* with any of the known mannites, and that he has not yet been able to transform it into glucose.—*Répert. de Phar.*, July 10.

NEW METHOD OF TESTING THE PURITY OF BUTTER.[1]

By G. Firtsch.

The method depends on the solubility of the barium salts of the volatile fatty acids of butter fat. From 0·99–1·01 gram of the clarified fat is heated in a strong flask of 150 cc. capacity with 50 cc. of $\frac{1}{10}$ N. barium hydroxide for 6–8 hours at 140° by means of a paraffin-bath. It is frequently advisable to allow the flask to cool at the end of 3 hours in order to bring the little fat, which adheres to the sides of the flask, into the reaction, which is assisted by the frothing up which takes place when the heating is resumed. When the saponification is complete, the contents are passed as rapidly as may be through a filter into a half-litre flask, and washed with boiling water until the flask is full. The separation of the soluble from the insoluble barium salts is perfect excepting in the case of cocoa-nut oil, which contains lauric acid. The insoluble barium salts are

	Per cent. of total combined barium.			
	Ba in insol. salts.		Ba in sol. salts.	
Butters, I	68·47		31·53	
" II	66·48		33·52	
" III	65·84		34·16	
" IV	68·99	mean	31·01	mean
" V	67·11	67·26	32·89	32·74
" VI	67·21		32·79	
" VII	66·75		33·25	
" VIII	69·80		30·20	
Pig-suet, I	81·04		18·96	
" II	80·60		19·40	
Tallow,	87·07		12·93	
Margarin, I	76·62		23·38	
" II	75·16		24·84	
Butter, 70 per cent.; suet, 30 per cent.	70 86		29·14	
" 50 " " 50 "	74·02		25·98	
" 30 " " 70 "	78·37		21·16	
Cocoa-nut oil,	66·98		33·02	
Palm oil,	73·24		26·76	

[1] *Ding. Polyt. J.*, **278**, 422–429, *Jour. Chem. Society*, July, p. 868.

decomposed with 25 cc. ½ N. hydrochloric acid and warmed on the water bath, filtered, washed and weighed.

In the solution of the soluble barium salts, the excess of barium is determined by means of $\frac{1}{10}$ N. hydrochloric acid, as also the total amount of barium as sulphate. From the three determinations, the amounts of the insoluble fatty acids, the soluble fatty acids calculated as butyric acid, and the respective amounts of barium combined with them are obtained. The author's results are given in the table on the preceding page.

By distilling the solution containing the acids from the soluble barium salts, figures were obtained which did not agree with those obtained by the Reichert-Meissl method. The weight of the acids of the insoluble barium salts agreed with those obtained by Hehner's method.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Iowa State Pharmaceutical Association assembled at its twelfth annual meeting at Spirit Lake, July 21. President Torbert's address contained many suggestions which furnished material for discussion and action, more particularly in relation to the cut-rate problem. A. A. Broadie, Waverly, was elected president for the current year, and treasurer J. B. Webb, DeWitt, and secretary Rosa Upson, Marshalltown, were re-elected to these positions.

The Maine Pharmaceutical Association is the oldest State Pharmaceutical Association in the country, having been organized in July, 1867, and in the month of September following was represented at the meeting of the American Pharmaceutical Association by Dr. H. T. Cummings and Chas. K. Partridge. Both gentlemen were present, and the last-named presided, at the meeting in Portland, July 23, last, at which the activity of the association was revived, after a dormancy extending over a number of years. The meeting attracted very general attention outside the realm of pharmacy, owing to the vigorous denunciation, in the president's address, of the Maine prohibitory laws which, after nearly half a century's trial, he characterized as a moral, political, demi-religious fraud; in illustration he stated that if alcoholic stimulants are prescribed for a patient, the apothecary, on filling such a prescription, has his legal place of residence in the county jail, and in addition thereto, his pocket-book should be legally mulcted of a handsome sum.

The officers for the present year are: C. K. Partridge, Augusta, president; H. B. Pennell, treasurer; H. E. Bowditch, Augusta, secretary; and H. T. Cummings, Portland, corresponding secretary. The next meeting will be held in Bangor, at a time to be announced hereafter.

The New York State Pharmaceutical Association held its thirteenth annual meeting at Bluff Point, near Plattsburg, June 23, President W. G. Gregory, presiding. The treasurer reported a balance of $679 on hand; the membership was increased to over 800. The customary reports were read; also a

number of papers, and the resolutions concerning cut-rates, adopted in New Orleans, were considered and slightly modified. C. S. Ingraham, Elmira, was elected president; secretary C. W. Holmes, Elmira, and treasurer C. H. Butler, Oswego, were re-elected. Syracuse was selected as the place for holding the next meeting in the month of May, 1892.

The North Carolina Pharmaceutical Association held its twelfth annual meeting at Morehead City, July 8, at which also a delegation from the Medical Society of the same state was present, participating in discussions on counter-prescribing by apothecaries, on the prescribing of secret and proprietary preparations by physicians; on the National Formulary and similar topics. The association is endeavoring to obtain an appropriation of $1,000 for the purpose of establishing at the State University a chair of pharmacy. Besides the president's address and the usual reports several papers were read and discussed. W. H. Wearn, Charlotte, was elected president; F. W. Hancock, New Berne, secretary, and A. J. Cook, Fayetteville, treasurer. The association will meet again at Raleigh, August 10, 1892. W. H. King is the local secretary.

The following printed proceedings of State Pharmaceutical Associations have been received:

Kentucky; 14th annual meeting. Pp. 112. See July number, p. 370; the local secretary is O. W. Geier.

Missouri; 13th annual meeting. Pp. 155. See July number, p. 371.

EDITORIAL.

Membership in the American Medical Association.—This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues. Attendance as a delegate at an annual meeting of the Association is not necessary in order to obtain membership. On receipt of the above amount the weekly Journal of the Association will be forwarded regularly.

Membership in the American Pharmaceutical Association.—The preceding paragraph suggests comparison with the steps required for securing membership in this Association, in which at the time of its organization in 1852 there was a strong sentiment of restricting its membership to delegates from pharmaceutical societies and colleges; to representatives elected by ten druggists in localities where such organizations were not in existence, and to isolated pharmacists residing in places with too small a constituency for sending such a representative. It was, however, decided to admit to membership besides regular delegates, reputable pharmacists recommended by three delegates from their locality or by three members of the Association. Beginning with 1855 application had to be made to the Executive Committee, and though the constitution did not *require* any endorsement, it was customary for the applicant, if unknown to the committee, to furnish some recommendations from two or more apothecaries, wholesale druggists, physicians or other persons; the elec-

tion was decided by two-thirds of the members present at a meeting, or in the interim by the unanimous action of the committee. In 1865, the membership of the Association having extended over most of the States, an endorsement of the applicant by two members was required, and election in the recess between the annual meetings was abolished. Since 1880 the applications had to be examined by the Council before being reported to the Association; and since 1887 suitable candidates for membership need not formally make application, but may be proposed by two members in good standing.

No change has been made in the admission of *delegates* if present at the meeting; they may become members by signing the constitution and by-laws, and, therefore, are virtually elected members of the national association by the local associations appointing them; the only restriction being with regard to such who may have been expelled or dropped from the roll for non-payment of dues. At the organization of the Association in 1852 only six pharmaceutical colleges and associations were known and had appointed delegates, namely, Boston, New York, Philadelphia, Baltimore, Richmond, Va., and Cincinnati; at the present time there are but very few States without a pharmaceutical association, and in view of the fact that the delegates from each may become members of the national body without formal election by the latter, it would seem but logical that any member in good standing in one of the former should be entitled to join the national association under similar conditions, without being appointed a delegate. Others might still be elected upon application or by proposition and invitation.

The State Pharmaceutical Examining Board of Pennsylvania held an examination in the High School at Williamsport on Tuesday, July 14, 1891. Fifty-one candidates appeared for examination, thirty-three applying for Registered Pharmacist's certificates, and eighteen for Qualified Assistant's certificates. Eleven of the former and ten of the latter class were successful.

Two new members of the board were present at this examination, Charles T. George, of Harrisburg, in place of H. B. Cochran, resigned, and Louis Emanuel, of Pittsburg, in place of F. H. Eggers, whose term had expired.

A Convention of Retail Druggists' Associations has been called by the St. Louis Apothecaries' Association, to convene at the Southern Hotel, St. Louis, September 3, at 10 o'clock, A. M.. The call was issued under date of August 17th and 25th, for the purpose of considering trade subjects, and to confer on ways and means to cut the cutter on patent and proprietary articles, likewise to adopt measures which will take the traffic in these goods out of the trade bazaars and department stores.

The meetings of the Congress of American Physicians and Surgeons will be held in Washington from 3 to 6 P. M., September 22d, 23d, 24th and 25th, 1891. William Pepper is chairman of the Executive Committee.

The American Public Health Association will hold its nineteenth annual meeting in Kansas City, Mo. and Kan., October 20 to 23 next. Among the topics for consideration are: (1) Sanitary construction in house architecture; (2) railroad sanitation; (3) meat supplies; (4) milk supplies of cities; (5) arsenical papers and fabrics, and (6) isolation hospitals for infectious diseases in cities. Dr. Irving A. Watson, Concord, N. H., is Secretary of this Association.

The solution of an arithmetical problem, as contained in a letter recently received, will be appreciated by our readers, we think; it is as follows: "I asked whether the time was four years, counting 365 days to the year, or do you mean that your year's time is a certain portion of a year of 365 days. I understand it this way: the two winter terms for Junior and Senior is counted two years. Six months during vacation or between junior and senior terms, and six months' experience is required before entering College. These 2 six months is equivalent to 2 years; hence, the Junior and Senior term, and these 2 six months are equivalent to 4 years."

International Pharmaceutical Congress.—The following is a translation of a circular letter received some time ago, and explains itself:

SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS IN MILAN.

COMMITTEE ON ORGANIZATION,
VIA FIORI OSCURI, 13.

MAY 15, 1891.

Honorable Colleagues:

The directors and proprietors of Italian pharmacies, especially those of the northern provinces of the kingdom, perturbed by the changes in the conditions of practice and property, brought about by the new law of December 22, 1888, for the protection of public hygiene and sanitation, and, by legal contests with the Government over the new exactments, in defence of their rights, have not been able to coöperate towards the success of the Pharmaceutical Congress in Milan, to the extent they promised before the new law, affecting their interests so strongly, went into effect.

Notwithstanding these difficulties the Committee on Organization would have persevered in the undertaking, had it not been for the fact of the very discouragingly small number of adherences received, thus cutting off every hope of success. Despite the announcements and invitations made in the principal foreign and Italian journals and the 25,000 circulars forwarded, the Committee received scarcely thirty assents (adesioni).

After that the Committee was compelled to yield to the opinion expressed by the Chemico-Pharmaceutical Association of Lombardy, charged by the Congress of Brussels with promoting the reunion at Milan, that the present was inopportune for the convocation in Milan, of the Seventh Pharmaceutical Congress, owing to the grave crisis through which the Italian pharmacists are now passing, as the result of carrying into effect the new law previously mentioned.

The Committee, therefore, resolved to postpone the convocation of the Congress to a more opportune time, and meanwhile expresses the warmest thanks to all colleagues and scientists who have rendered assistance.

For the Committee on Organization,

The President: SEN. COMM. PROF. STANISLAO CANNIZZARO.

The Vice-Presidents:	The Secretaries:
COMM. PROF. DIOSCORIDE VITALI,	DR. ARTURO CASTOLDI,
DR. GIUSEPPE PESSINA.	CHIM. FAR. VITTORIO VENTURINI.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Massage, a primer for nurses, by Sarah E. Post, M. D. Lectures before the Training Schools for Nurses connected with Bellevue Hospital, Mt. Sinai Hospital, St. Luke's Hospital and Charity Hospital, New York. Second edition, with seven original photo-plates. New York : The Nightingale Publishing Co., 1891. 12 mo. pp. 53. Price $1.

Intended for the instruction of professional nurses on the correct application of massage, it is equally well adapted for the use of any intelligent person, since the explanations and instructions are brief, but clear and comprehensive. Besides the photo-plates which illustrate different motions of massage, several cuts are introduced in illustration of the massage of the neck.

Report of Willis G. Tucker, M.D., Ph.D., analyst of drugs. Extract from the 11th annual report to the State Board of Health (New York). pp. 65.

The report shows about the same conditions as the preceding one (see Amer. Jour. Phar., 1890, p. 477); perhaps an improvement may be noticed in the condition of the following articles which make the least favorable showing. Of 46 samples of compound spirit of ether 12 were of good or fair quality ; 17 out of 30 specimens of stronger ether passed inspection ; of 20 samples bought as saffron six passed muster, the remaining consisting of safflower ; of 37 samples of precipitated sulphur, ten were correct, five were sublimed or washed sulphur, and the remainder consisted of milk of sulphur contaminated with calcium sulphate.

Thirty-fourth annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria ; with list of Members and Hon. Members. Melbourne : 1891. pp. 22.

Twenty-first annual Report of the Council of the Pharmaceutical Association of the Province of Quebec, for the year ending April 30, 1891 ; with proceedings of the annual meeting held June 10th, 1891. Montreal : pp. 19.

Report of the Board of Managers of the Pennsylvania Hospital. Philadelphia : 1891. pp. 91.

The report was presented at the meeting of the contributors in May, and covers the departments of the sick and wounded and of the insane, also the accounts of the treasurer and stewards.

Minutes of the thirty-ninth Annual Meeting of the American Pharmaceutical Association, held at New Orleans, La., including the reports and papers read. 1891. pp. 256.

Owing to the early date of this year's meeting, the Council deemed it proper to place the official transactions into the hands of the members of the association several months before the report on the progress of pharmacy can be completed and printed ; and this pamphlet has now been sent out during the latter part of August, in compliance with the resolution of the Council referred to. Our June number, page 307, contains a full synopsis of these transactions. These will also be contained in the bound volume, which will be furnished to the members at a later date, when the printing of the annual report on the progress of pharmacy and of the general index to the "Proceedings," for 1883 to 1890 shall have been completed. "Notice to Members," has been printed on the cover calling attention to the reduced prices, at which

the preceding volumes are offered, and the inducements held out in the shape of discounts, for completing sets of these publications, beginning with the first issue in 1851, to any one year up to the present time. Thus the first ten volumes, now on hand, will cost $4.02; the first twenty volumes, $11.55; the first thirty volumes, $23.50, and the complete set of 39 volumes, $35.50.

A Text-Book of Practical Therapeutics, with especial reference to the application of remedial measures to disease and their employment upon a rational basis. By Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, etc. Second edition, enlarged and thoroughly revised. Philadelphia: Lea Brothers & Co. 1891. 8vo. pp. 658. Price, cloth, $3.75; leather, $4.75.

Only a few months ago (see December number, 1890, p. 634) we noticed the appearance of this work, the value and usefulness of which is shown by the fact that it has become a text-book in several medical schools, and that a second edition has already become necessary. Various additions have been made to the contents; thus a number of new drugs are discussed, and such remedial measures as leeching, rest-cure and suspension; tables on metric and apothecaries' weights and measures have been added, and a large number of new prescriptions have been inserted. As might have been expected the text has been carefully scrutinized and rendered more correct and clearer where it was deemed necessary, so that in all respects the work is true to its aim of being a reliable guide in the study of therapeutics. Some erroneous or vague statements have been carried over into the present edition, among which the following may be mentioned. Agaricin (p. 42) is obtained from white agaric, Polyporus officinalis, while punk is derived from P. fomentarius. Under arsenic (p. 70) the distinction between arseniates and arsenites should be mentioned. Physostigma venenosum is a woody climber, not a tree (p. 260). Oil of sandalwood is, or should be, derived from Santalum album, not from Pterocarpus santalinus (p. 277).

Notes on New Remedies, including the Additions to the British Pharmacopœia of 1890. Compiled by E. B. Shuttleworth, Dean and Professor of Chemistry, Ontario College of Pharmacy, etc. Toronto: Monetary Times Printing Company. 1891. 12mo. Pp. 87.

The large majority of the remedies noticed in this little book are synthetical compounds or proximate principles introduced into medicine during late years; but also pichi, manaca, and some other plants have found a place, as well as all the new additions to the British Pharmacopœia; a synopsis of the galenical preparations admitted into the latter has been given in our January number, page 14. The little work before us is intended as a compendium of, what are at present, new remedies, giving a brief history of the introduction or derivation of the article, its physical and medical properties, the uses, doses and modes of administration. It is intended for the practical use of the physician and pharmacist, and will serve a very useful purpose, since the compilation has been very carefully made, and the facts are given in a concise form.